

Nomenclature of the variation mentioned in Table I.

[The ordinal numbers and letters correspond to those in the Table.]

- A. Race of Florence: *intermedia*, Rocci.
- B. Race of Bolognola: *altitudinaria*, Turati.
- C. Race of Formia: *transiens*, Rocci:—
 - 1-3. Unnamed forms transitional to *emendata*, Vrty. (15%).
 - 4-6. Forms similar to those of race *maritima*, Oberthür (56%).
 - 7-8. Variations of form *pseudomaritima*, Turati (10%).
 - 12-13. Form *maritima-trimaculata*, Obthr. (14%).
 - 14. Form *depuncta*, Trti. (2%).
 - 15. Form *pseudosorrentina*, Trti. (2%).
 - 16. Form *pseudosorrentina-depuncta*, Trti. (only one specimen amongst about 3,000 individuals which have been examined).
- Race of Villalatina: *latina*, Vrty:—
- D. Bright red colour:
 - 4-6-8. Variations of form *sorrentina-sexmacula*, Dz. (4%).
 - 9-10. Unnamed red forms (31%).
 - 11. Form *calabrica-hexamaculata*, Trti. (4%).
 - 13-15. Form *sorrentina*, Stgr. (1%).
 - 17-19. Unnamed red forms (26%).
 - 20-22. Variations of form *calabrica*, Calb. (6%).
- E. Yellow colour:
 - 6. Form *flava*, Dz. (2%).
 - 8-10. Form *xanthographa*, Germ. (12%).
 - 15. Unnamed form.
 - 17-19. Form *boisdurvali*, Costa.
 - 20-21. Variations of form *zickerti*, Hoff. (5%).
- F. Pinkish colour:
 - 9-11-18. Form *rhodomelas*, Trti.

On the Geographical Variation of *Zygaena loti*, Wien. Verz. subspecies *transalpina*, Esp.

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The magnificent material collected during the last few years in Central and Southern Italy, by Querci and his family, has been more or less a revelation as regards the geographical variation of several species of *Zygaena* in that region. They are extremely variable, and far too many fancy names have been given to individual forms without a notion of their frequency and distribution. Querci has just drawn out a very instructive statistic of the forms of *transalpina* in several races, utilising thousands of specimens he has at hand.

I will now try and make out a brief summary of the races which have proved to be discernible in Italy, making a clear distinction between them and individual variations. This does not seem to have been achieved by any of the authors of Monographs on this genus, such as Dziurzynski and Seitz, who give interminable lists of names of minute variations without furnishing any information as to their frequency and importance.

The nomenclature of this genus is unfortunately extremely intri-

cate, owing to the difficulty of distinguishing even the species from each other and the blunders which have ensued. Even at the present time it needs quite a long practice to utilise the knowledge that has been acquired on the subject; for instance, I rarely receive a series of *filipendulae* and of *loti* from localities where they fly together, in which the specimens have been properly separated, and in as recent a work as *Die-schmett. Europas.* of Spuler, one finds at pl. 77, fig. 18a, a *transalpina* figured under the name of *stoechadis* var. *dubia*! An unmistakable character which distinguishes all the subspecies of *filipendulae* from all those of *transalpina*, no matter how similar to each other they may be in certain regions, is the position of the hind row of red spots of the forewing as compared to the corresponding spots of the fore-row; the former in *transalpina* are always situated more outwardly; and a line drawn parallel to the direction of the body through these spots does not pass through the spot which stands in front of it, as it does in *filipendulae* and in its subspecies *stoechadis*. No author seems to have noticed this character, which is the only really constant and reliable one, to my knowledge, the thickly scaled and extensive red patch of the underside of the forewings of *loti*, which distinguishes the two species in Central Europe, being so often reduced or absent in the Italian *transalpina*.

I must take this occasion to note first of all that, if I am not wrong, the specific name of the *Zygaena* in question has not yet been established correctly according to strict rules of priority! It has always been called *transalpina*, but in the second vol. of his *Eur. Schmett.*, in which Esper creates this name, this author also publishes the figure of a *Zygaena* under the name of *loti*, which certainly is the little Central European subspecies of the same species, and he says in the text (page 224) that the latter name was given to specimens from Vienna by "the Authors of the *System. Verzeichniss der Wiener Schmetterlinge.*" This can leave no doubt that the name existed in this well-known list, from which several specific names have been drawn in other instances, some time before Esper published his second vol. with the name *transalpina*. Also Hübner refers the name *loti*, not to Esper, but to "d. Ther.," that is to say to the Theresians, who are the authors of the Vienna List. I conclude that the specific name should be *loti*, and that the nymotypical group of races of Central Europe should bear the same name, whereas the name *transalpina* should be restricted to the South European subspecies or group of races.

The name *astragali* is purely a synonym, created fancifully by Borkhausen, and so is *hippocrepidis*, first used by Hübner in his text, and then taken up by Stephens and by Herrich-Schäffer.

I do not intend dealing here with the group of races of Central Europe, distinguished by their small size, frail build, and extent of red scaling, especially on the underside of the forewings; suffice it to mention that the following races have been distinguished: *occidentalis*, nymotypical, *centralis* (*provincialis*), and *ALPICOLA*, mihi. The name last mentioned I propose using instead of the name *alpina*, which Boisduval has given first to a *filipendulae* and then to a *loti*: the other races mentioned have been described by Oberthür. The Alps and Pyrenees race *alpicola*, evidently belongs to the same subspecies, on account of the development of the red scaling on the underside of forewings, but by its stouter build and larger size it is clearly a transition to the subspecies *transalpina*.

Race *emendata*, Vrtý.:—Of the *transalpina* subspecies one race comes nearest to *ALPICOLA* by the extent of the red scaling on underside of forewings; the red spots of upperside are more extensive and the blue-black border of hindwings narrower than in any other race of *transalpina*; on the other hand it unmistakably belongs to it by its larger size, robust build, very bright colouring, the scaling being thick. I have called it *emendata* [*Bull. Soc. Ent. It.*, xlvii., p. 76 (1915)], because at one time it was thought by Turati and others to be the nymotypical *transalpina*, whereas I have pointed out that Esper's figure clearly, though roughly, represents either *altitudinaria*, Trti., or *intermedia*, Rocci. (*vide antea*). It is widely distributed in the Po valley and lower localities of the Alps (Como-Brunate, Valcamonica at Cagno, Limone in Piedmont), and even extends to Central Italy along the Adriatic (Macerata).

From this race *transalpina* may be described as branching off into two groups: (a) the small, frail, thinly scaled and less bright mountain group of races, and (b) the maritime group, with exactly opposite characters. In each of these two groups the races may be classified, according to the extent of the blue-green scaling, as follows:—

(a) *intermedia*, Rocci.; *altitudinaria*, Trti.; *sorrentina*, Stdgr.; *latina*, mihi; *calabrica*, Calb. (to this group seems also to belong *hispana*, mihi).

(b) *maritima*, Obth.; *transiens*, Rocci.

Race *intermedia*, Rocci.—Between *emendata* and *altitudinaria*, there exists a race which is intermediate in build and which, in extreme individuals, is identical either with *emendata* or with *altitudinaria*, according to localities, thus leading gradually up from one to the other. Also its distribution proves it is intermediate. It spreads all over the Po valley, especially south of this river, where it is less localised than *emendata*; in Liguria, Rocci found it at median altitudes, above *maritima*, Obth., and below *altitudinaria*, Trti.: in Tuscany it is the only representative of the species, both on the sea coast (Leghorn) and in the plains and low hills of the hinterland, so that it constitutes there a very definite race, only blending with *altitudinaria*, Trti., in the higher mountains. Rocci has called it *intermedia*.

Race *altitudinaria*, Trti.—Small, reaching the smallest size of *transalpina* in extreme individuals, such as those who emerge late (autumn), but are probably not at all a second brood [*autumnalis*, Vrtý.]; antennæ thin; body frail; wings narrow; red spots pale; red patch on underside of forewings generally absent in male and very reduced in female; dark scaling of a decided green tinge, and light enough to show off black circles round red spots; dark band along margin of hindwing very narrow. This race extends from Liguria to the Abruzzi, all along the tops of the Appennines, and also in lower mountain localities, when they are particularly cold.

The race described above very comparatively very little in single individuals; they all belong to the six-spotted form, with narrow dark margin to hindwing; only occasionally does it get a little broader and diffused in *intermedia* and *altitudinaria*; Costantini has observed in the Modenese that this happens chiefly in early emergences and he has called these specimens form *praeceor*.

These races are equivalent to the nymotypical group of races of *Z. ilipendulae*, L. The following ones are characterised by a

greater extent of the dark scaling, which often reduces the spots of forewing to five, and which tends to invade the whole hindwing and the underside of the forewing, conferring a much more variable look to the individual forms of each race. They correspond to the dark *stoechadis* sub-species of *filipendulae* and group *b* also has the same robust structure. The mountain melanotic forms of *transalpina* have been called *sorrentina*, Stdgr., and *calabrica*, Calb., the latter having the whole of hindwing darkened and the former being a transition, with a broad space left free of dark scales. These forms occur together and occur mixed with transitions to *altitudinaria* in very variable proportions, according to localities, so that local races are produced having on the whole very different aspects. To give a name to every gradation would be impossible and quite useless, but we can agree on a few names to designate the principle types of variation and then use statistical data to better define the races of the various localities.

Race *sorrentina*, Stdgr.—There are regions in which variation extends from *altitudinaria* to *sorrentina*, extreme specimens of these forms being frequent, but the majority consisting of a form similar to *altitudinaria* with the difference that the dark border of the hindmargin is broad, or very broad, and sends out rays towards the dorsal margin, such as are never seen in *altitudinaria*; the five-spotted form also occurs occasionally; the size of the insect is on the whole a little larger and the very small individuals of *altitudinaria* are not produced. To these races I should give the name of *sorrentina*, extending it to those in which *calabrica* does occur, but in a very small percentage. This is the case in the Sorrento Peninsula; at Polleca, in the Aurunci Mountains, *calabrica* does not exist at all. This race is proper to the extreme southern portion of Central Italy and to Southern Italy, and we were very surprised when Querci in 1915 found it as far north as Northern Tuscany on Pratofiorito, 1,000 m., and at Montefegatesi, 700m. (Lucca). Here *altitudinaria* has an unusually broad marginal band and extreme specimens are identical with nymtotypical *sorrentina*.

Race *calabrica*, Calb.—The races in which this form is found in a very high percentage, which sometimes is over 50%, and the remainder consists of *sorrentina*, should, I think, bear this name.

Race *LATINA*, mihi.—In the Mainarde Mountains, at Villalatina, and along the road from Atina to S. Biagio Saracinasco, a magnificent race is found, more variable than any other; Querci's statistical table illustrates it better than any words. It will be noticed that the extent of the dark scaling corresponds to *calabrica*, but what makes it quite distinct and peculiar is the variation of the red scaling to pink and to yellow in more than half the individuals. In some localities the two preceding races do produce the yellow form constantly and not merely as a very rare aberration, but in no other has it been found to predominate. Most specimens thus belong to the yellow *calabrica*, called *zickerti* by Hoffman, but I think that to use the name of a single very special form for such a variable race would only lead to confusion, and both Querci and I have agreed to give it a geographical name. It is worthy of notice that in peninsular Italy also *Callimorpha dominula*, L., produces a race characterised by yellow scaling, instead of red, and by the variability and occasionally very great extent of the black pattern.

Race *hispana*, mihi.—In the Rühl collection, preserved in Florence

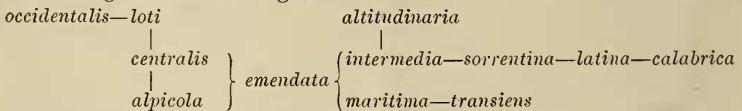
in the R. Stazione d'Entomologia Agraria, there exists a very interesting specimen labelled: "Valenzia," which I must take this occasion to mention. It is quite similar to nymotypical *sorrentina*, as described above, but each one of the six spots of the forewing is surrounded by a white ring; this character is extremely rare and never so marked in Italy. Does *transalpina*, then, occur in Spain and does it produce quite a distinct race?

The races of group *b* hereunto described are the two following:

Race *maritima*, Obth.—Similar to *emendata*, but with brighter colouring and with the dark scaling tending to expand; red spots smaller; the sixth often absent; hindwing with a broad dark margin; sometimes very broad and never as narrow as in *emendata*; red patch of underside forewings always narrow and occasionally entirely absent. This is the race of the south of France, which extends in Italy, along the Riviera, as far as is known, up to Genoa.

Race *transiens*, Rocci.—So called because in extreme specimens the dark scaling is as extensive as in *sorrentina*, invading the whole dorsal margin and anterior portion of the hindwing, and thus believed to be a transition from *maritima* to *sorrentina*. This view however is not correct, for the structure of *transiens* is even more robust than that of *maritima*, whereas a real transition to *sorrentina* should come nearer the frailer build of the latter. The right way of putting it is that *transiens* stands to *maritima* as *sorrentina* stands to *altitudinaria* or *intermedia*, being the most melanotic race of the robust maritime group. Rocci says at Genoa it flies quite near the sea, lower than *maritima*. The race, found by Querci at Formia, in the province of Caserta, at low altitudes and considered as *maritima* by Oberthür and Turati, has turned out to be identical with *transiens* on comparison with a series from Genoa sent to me by Rocci.

I think the following diagram will help to clear the connections between the different races, if it be borne in mind that the robustness of their structure increases from above downwards and the extent of dark scaling from left to right:—



Comparison of four races of subspecies *transalpina*, Esp. :—

Locality	Florence.	Bolognola.	Formia.	Villalatina.
Name	<i>intermedia</i> , Rocci.	<i>altitudinaria</i> , Trti.	<i>transiens</i> , Rocci.	<i>latina</i> , Vrtj.
Body	Thick.	Thin.	Very thick.	Thick.
Antennæ	Thick.	Thin.	Very thick.	Thick.
Density of scaling	Thick.	Thin.	Very thick.	Thick.
Light coloured scaling.	Bright red.	Pale red.	Bright red.	Bright red or yellow, occasionally pinkish.
Dark scaling	Indigo.	Greenish-indigo.	Dark indigo.	Dark blackish indigo.
Spots of upper-side of forewings.	Constantly six well developed spots.	Constantly six well developed spots.	Five or six spots, the sixth being anyhow much reduced in the majority of individuals.	Five for six spots, the sixth being anyhow much reduced in the majority of individuals.

Dark marginal scaling of hind-wings.	About 1 mm. in width.	About 1 mm. in width.	Variable: 1 to 3 mm., but often extends to dorsal margin and fore-part of wing.	Usually extensive, and often so much so as to cover the whole wing.	
Spots of underside of fore-wings.	Always six, often more or less confluent.	Always six, often more or less confluent.	Five or six, confluent or isolated.	Five or six, always distinctly isolated.	
Wing expansion	usual ..	♂ 31 mm.	♂ 27 mm.	♂ 31 mm.	♂ 29 mm.
		♀ 31 mm.	♀ 28 mm.	♀ 31 mm.	♀ 30 mm.
		♂ 36 mm.	♂ 29 mm.	♂ 36 mm.	♂ 31 mm.
		♂ 33 mm.	♀ 33 mm.	♂ 36 mm.	♂ 33 mm.
		♂ 27 mm.	♂ 26 mm.	♂ 26 mm.	♂ 27 mm.
Breadth of wings	Narrow.	♀ 29 mm.	♀ 26 mm.	♀ 29 mm.	♀ 28 mm.
			Very narrow.	Broad.	Narrow.

Sydney Webb Collection.—2nd Day's Sale. December 9th, 1919.

(Concluded from p. 11.)

This sale comprised the remainder of the Fritillaries and all the remaining species, finishing with the Skippers.

The first insect of note was a dark brown var. of *Melitaea athalia* with markings almost obsolete which realised £12 12s. Another var. *eos* figured in Newman, p. 46, fig. 3, and a similar var. with many bands of distinct spots on the underside fig. in Newman brought £6 10s. A third specimen somewhat similar also recorded £6 10s. A *Melitaea aurinia* with broad buff bands fetched £2, and two similar £4 the pair; a very dark specimen cost £5 10s. and one nearly all black £7; other good forms realised £1 1s. to £2 in lots of 2 to 20, various localities being represented. A very fine underside of *Melitaea cinxia* realised £5, and various underside forms from 8s. to 60s. in lots.

Fourteen *Chrysophanus dispar* were next produced, but were not nearly so fine as the series sold in the first sale and were priced at £2 5s. to £8 according to condition. Lot 45 a fine female *C. dispar* with coppery hindwings, a really good variety, was remarkably cheap at £10, and in my opinion was one of the best insects in the sale. Aberrations of this species are not often met with even in Covent Garden. *Rumicia phlaeas* was represented by a splendid lot of varieties, the best realising £12 12s., being a specimen with the black replaced by golden brown and figured in Barrett, p. 9, fig. 2e. Another one figured in Barrett, p. 9, fig. 2c, with large confluent spots, realised the exceptionally good price of £12. A specimen with forewings without spots except discoidals, figured in Barrett, p. 9, fig. 2d, went for £7 10s. The silvery white (ab. *alba*) and pale golden coloured (ab. *schmidtii*) aberrations were not in the best of condition, but fourteen specimens aggregated £13 11s. Three fine and perfect pale golden vars. were well worth £3 5s. Two rayed and four with hindwings all black were cheap at £2; a lot of 11, including five others, realised £5, and a similar lot £2 5s. The remaining noticeable specimen with spots on forewings absent realised £3 5s. The *Chatteudenia (Thecla) w-album* underside with broad white fascia figured in Newman, p. 108, cost the purchaser £5, but although in poor condition it is a unique variety and of much interest. Two *Bithys quercus* females with the blue shading almost absent, and one with orange spots were undeniably cheap at 12s. the two lots. *Callophrys rubi* and *Celastrina argiolus* were not